

Claims

We claim:

1. A communication system, comprising:

phone line side circuitry that may be coupled to phone lines;

powered side circuitry that may be coupled to the phone line side circuitry through an isolation barrier; and

a DC holding circuit within the phone line side circuitry, the DC holding circuit being programmable in response to data transmitted across the isolation barrier to operate the DC holding circuit in a plurality of modes, the DC holding circuit operable in at least a first mode to meet a first phone line interface standard and a second mode to meet a second phone line interface standard, the second phone line interface standard having a DC current limit requirement.

2. The communication system of claim 1, the DC holding circuit comprising a phone line side integrated circuit and at least one external device, the external device dissipating more power in the second mode than in the first mode.

3. The communication system of claim 1, further comprising the isolation barrier coupled between the phone line side circuitry and the powered side circuitry, the isolation barrier being a capacitive barrier.

4. The communication system of claim 1, wherein the phone line side circuitry and the powered side circuitry are configured to communicate across the isolation barrier through digital signals.

5. The communication system of claim 4, further comprising the isolation barrier coupled between the phone line side circuitry and the powered side circuitry, the isolation barrier comprising one or more capacitors.

6. The communication system of claim 2 wherein a substantial portion of the power dissipated by the DC holding circuit in the second mode is dissipated external to the phone line side integrated circuit.

7. The communication system of claim 6, wherein 50% or more of the power dissipated by the DC holding circuit is dissipated external to the phone line side integrated circuit.

8. The communication system of claim 7, wherein 50% or more of the power dissipated by the DC holding circuit is dissipated in one or more passive external devices.

9. The communication system of claim 6, wherein the one or more passive external devices are one or more resistors.

10. A method of providing a communication system that may be coupled to a phone line, comprising:

coupling an isolation barrier between powered circuitry and phone line side circuitry; and

forming a DC holding circuit within the phone line side circuitry, the DC holding circuit comprising a phone line side integrated circuit and external circuitry external to the integrated circuit;

providing a programmable circuit for switching the DC holding circuit between at least a first and second mode of operation, the first mode of operation for at least a first phone line interface standard and the second mode of operation for at least a second phone line interface standard, the second standard having a DC termination current limit; and

coupling the internal circuitry and external circuitry so that if the DC holding circuit is operated in the second mode of operation more power may be dissipated in the external circuitry during the second mode of operation than during the first mode of operation.

11. The method of claim 10, further comprising utilizing a capacitive barrier to isolate the powered circuitry and the phone line circuitry.

12. The method of claim 10, further comprising passing digital data across the isolation barrier.

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13. The method of claim 12, further comprising utilizing a capacitive barrier to isolate the powered circuitry and the phone line circuitry.

14. The method of claim 13, further comprising dissipating more power during the second mode of operation in the external circuitry than in the internal circuitry.

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15. The method of claim 14, further comprising dissipating more than 50% of the power dissipated in the second mode in one or more passive devices.

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16. The method of claim 14, wherein the one or more passive devices are one or more resistors.

17. A DC holding circuit for reducing power dissipation requirements of an integrated circuit within a communication system that may be connected to phone lines, the DC holding circuit comprising:

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at least one switchable circuit, the switchable circuit having a first state for a non-current limiting mode of operation and a second state for a current limiting mode of operation;

external circuitry external to the integrated circuit; and

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internal circuitry within the integrated circuit, the external circuitry and the internal circuitry being coupled together wherein the external circuitry dissipates more power in the current limiting mode than in the non-current limiting mode.

18. The DC holding circuit of claim 17, the external circuitry comprising at least one power dissipation resistor.

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19. The DC holding circuit of claim 17, wherein when the switchable circuit is in the second state, the external circuitry dissipates more power than the internal circuitry.

20. The DC holding circuit of claim 19, wherein when the switchable circuit is in the second state,
5 one or more resistors in the external circuitry dissipate more power than the internal circuitry.

21. The DC holding circuit of claim 19, wherein when the switchable circuit is in the second state, one or more resistors in the external circuitry dissipate more than half of the power dissipated by the DC holding circuit.

22. A method of providing a DC holding circuit, comprising:

forming the DC holding circuit with internal circuitry internal to an integrated circuit and
external circuitry external to the integrated circuit;

15 providing a programmable circuit for switching the DC holding circuit between at least a first and second mode of operation, the first mode of operation for at least a first phone line interface standard and the second mode of operation for at least a second phone line interface standard, the second standard having a DC termination current limit; and

20 coupling the internal circuitry and external circuitry so that if the DC holding circuit is operated in the second mode of operation more power may be dissipated in the external circuitry during the first mode of operation than during the second mode of operation.

23. The method of claim 22, further comprising dissipating more power during the second mode of operation in the external circuitry than in the internal circuitry.

24. The method of claim 23, further comprising dissipating, in one or more passive devices, more than 50% of the power dissipated by the DC holding circuit in the second mode of operation.

25. The method of claim 24, wherein the one or more passive devices are one or more resistors.

26. A method of forming a DC holding circuit, comprising:

5 providing integrated circuitry and non-integrated circuitry to comprise the DC holding circuit,
the DC holding circuit capable of meeting at least a first and second phone line
interface standards, the at least two phone line interface standards having differing
current limit specifications, the second standard limiting DC current to a lower amount
than the first standard;

10 utilizing at least one switchable circuit so that the DC holding circuit may be programmed for at
least one of the phone line interface standards; and

15 coupling the integrated circuitry and the non-integrated circuitry together so that when the DC
holding circuit is programmed for the second phone line interface standard, at least one
circuit element of the external circuitry will receive additional DC current as compared
to when the DC holding circuit is programmed for the first phone line interface standard.

27. The method of claim 26, further comprising dissipating more power in the external circuitry than
in the internal circuitry when the DC holding circuit is programmed for the second phone line interface
20 standard.

28. The method of claim 27, further comprising dissipating more than 50% of the power dissipated
by the DC holding circuit, when the DC holding circuit is programmed for the second phone line
interface standard, in one or more passive devices.

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29. The method of claim 28, wherein the one or more passive devices are one or more resistors.

30. The method of claim 29, further comprising providing at least one external transistor to steer
current to the one or more resistors.

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31. A DC holding circuit compatible with a phone line standard having current limit requirements for reducing power dissipation requirements of an integrated circuit within a communication system that may be connected to phone lines, the DC holding circuit comprising:

external circuitry external to the integrated circuit; and

internal circuitry within the integrated circuit, the external circuitry and the internal circuitry being coupled together wherein the external circuitry dissipates more power in at least one mode of operation.

32. The DC holding circuit of claim 31, the external circuitry comprising at least one power dissipation resistor.

33. The DC holding circuit of claim 31, wherein the external circuitry dissipates more power than the internal circuitry in at least one mode of operation.

34. The DC holding circuit of claim 33, wherein one or more resistors in the external circuitry dissipate more power than the internal circuitry in at least one mode of operation.

35. The DC holding circuit of claim 34, wherein one or more resistors in the external circuitry dissipate more than half of the power dissipated by the DC holding circuit in at least one mode of operation.

36. A method of providing a DC holding circuit, comprising:

forming the DC holding circuit with internal circuitry internal to an integrated circuit and external circuitry external to the integrated circuit, the DC holding circuit compatible with at least one phone line interface standard having a DC current limit requirement; and

coupling the internal circuitry and external circuitry so that more power may be dissipated in the external circuitry than in the internal circuitry.

37. The method of claim 36, further comprising dissipating, in one or more passive devices, more
5 than 50% of the power dissipated by the DC holding circuit.

38. The method of claim 37, wherein the one or more passive devices are one or more resistors.

39. The method of claim 38, wherein the passive devices include at least two resistors.

10 40. A method of operating a DC holding circuit, comprising:

providing integrated circuitry and non-integrated circuitry to comprise the DC holding circuit;

15 coupling the integrated circuitry and the non-integrated circuitry; and

dissipating more power in the external circuitry than in the internal circuitry if the DC holding circuit is utilized for a phone line interface standard having a DC current limit requirement.

20 41. The method of claim 40, further comprising dissipating more than 50% of the power dissipated by the DC holding circuit in one or more passive devices.

42. The method of claim 41, wherein the one or more passive devices are one or more resistors.

25 43. The method of claim 42, further comprising providing at least one external transistor to steer current to the one or more resistors.